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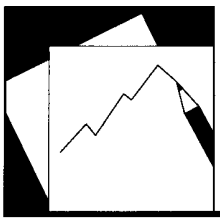

# IMF Working Paper

# Striving to Be "Clearly Open" and "Crystal Clear": Monetary Policy Communication of the CNB

*Aleš Bulíř and Kateřina Šmídková*

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# Striving to Be "Clearly Open" and "Crystal Clear": Monetary Policy Communication of the CNB

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## Abstract



The Czech National Bank has a respectable track record in terms of its policy actions and the corresponding inflation outturns. Using a simple forward-looking policy rule, we find that its main communication tools—inflation targets, inflation forecasts, verbal assessments of the inflation risks contained in quarterly inflation reports, and the voting within the CNB Board—provided a clear message in about three out of every four observations in our 2001–2005 sample.

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## I. INTRODUCTION

The Czech National Bank (CNB)—an inflation targeter since 1998—has scored high among the most transparent central banks (Fracasso et al., 2003), largely because the CNB is open and discloses a lot of information in a timely manner through inflation reports, minutes of policy meetings, and other channels. We argue, however, that monetary policy transparency has one additional, difficult-to-measure dimension, namely, clarity. A central bank that discloses quickly large volumes of information that are not "crystal clear," that is, unambiguously interpretable by the public, is not transparent even though it may be "clearly open" about its actions. We illustrate that Czech monetary policy communication can be classified not only as open and timely, but also as clear most of the time. Our policy conclusion is that openness of monetary policy communication is not a sufficient condition for transparency.

Empirical studies evaluating central bank transparency have worked almost exclusively with two dimensions only, namely, openness and timeliness. Monetary policy communication is said to be open when as much information as possible is disclosed ("clearly open"). Communication is timely when information is disclosed fast enough for the public to make use of it. In contrast, the third dimension—clarity of communication— has rarely been explored in studies to date, in part because it is more difficult to measure than the other two dimensions.

The empirical contribution of this paper is to suggest a way of measuring clarity of communication by looking at alternative measures of forecast risk that the public can obtain from central bank communication. For example, the public may learn from the inflation report that the central inflation forecast is 3 percent for next year but that the risks are biased upwards. Other things being equal, this would lead the public to deduce that if inflation deviates from the central forecast, the deviation is more likely to be on the upside. Other communication tools, such as minutes, speeches, interviews, and so on, can send either the same message or a different one about the forecast risk. We argue that it is much easier for the public to understand monetary policy if all communications send the same, crystal clear message, pointing to the same type of forecast risk. If, in contrast, alternative communications point in different directions, the public is likely to misunderstand monetary policy. Inconsistency between communication tools limits clarity and therefore also transparency of communication, irrespective of the volume of information disclosed.

We apply our measurement of transparency to Czech data. We first survey the various communication tools used by the CNB. We then compare them with the communication tools recommended in benchmark studies to evaluate the relative openness and timeliness of CNB communication. Finally, we compute three alternative measures of the expected deviation of inflation from the central forecast—based on various communication tools—and look at their mutual consistency. These calculations enable us to evaluate the clarity of CNB communication and we conclude that it is indeed clear. Since we find that the CNB is also

open and timely in its communication, we conclude that Czech monetary policy is transparent.

The paper is organized as follows. First, we summarize the methodological framework for the analysis of monetary policy transparency. Second, we evaluate the openness and timeliness of CNB communication. Third, we outline our methodology for assessing communication clarity. Fourth, we present the Czech empirical results. The final part concludes.

## II. TRANSPARENCY: OPEN, TIMELY, AND CLEAR COMMUNICATION

Inflation targeting has several important attributes that distinguish it from alternative monetary strategies. It is a forward-looking strategy that (i) employs explicit inflation targets and inflation forecasts2 in order to stabilize inflation expectations, and (ii) is performed in an open and transparent manner (Bernanke et al., 1999). We see a general and growing consensus among both academic researchers and central bankers that the latter point, that is, transparency, is crucial to the success of inflation targeting. We see, however, much less consensus on why it is crucial to be transparent, what exactly transparency is, and how it can be measured. This section is devoted to clarifying these two issues in order to develop a conceptual framework for the analysis of communication strategy.

Let us summarize the arguments for transparency. The three common arguments are: (i) maintaining the independence of the central bank, (ii) directly enhancing its macroeconomic performance, and (iii) building the credibility of monetary policy to indirectly enhance macroeconomic performance. According to the first argument, target and policy communication ensure that the central bank can be held accountable, in turn guaranteeing public support for its independence (Bernanke et al., 1999). According to the second argument, higher transparency should be directly associated with better economic performance, as well informed financial markets are better able to predict monetary policy actions, thus minimizing the damage of policy surprises (Blinder et al., 2001). There seems to be empirical evidence of this direct link; see, for example, the cross-country analysis in Chortareas et al. (2002) or the New Zealand case study of Drew and Karagedilki (2007). Filáček et al. (2007) found that transparency enhances the expectations channel of monetary transmission.

[2] Although we speak about inflation forecasts, we assume in this paper that the central bank produces forecasts for other important economic variables (not just inflation), such as economic growth and interest and exchange rate paths. When we speak about publishing inflation forecasts, we again assume that the central bank publishes forecasts of other variables (not just inflation). It is beyond the scope of this paper to go into more detail and discuss which parts of the forecast should be published. However, two other papers in this volume focus on exactly this problem (Apel and Vredin, 2007, and Filáček et al., 2007). Specifically, they evaluate the pros and cons of publishing the interest rate path.

The final argument of credibility building to some extent combines the two previous arguments for transparency: a well communicating central bank needs to be able to explain to the public its views on current and future economic conditions, its own actions, and the outcomes of these actions (Heenan et al., 2006, and Apel and Vredin, 2007). In doing so, the central bank ensures that monetary policy stays credible even if inflation deviates from the target, presumably due to nonmonetary shocks such as exchange rate movements, productivity shocks, and so on. In other words, the success of the inflation targeting strategy is not measured by inflation staying close to the target, but by stability of the macroeconomic environment and credibility of monetary policy. Empirically, more credible central banks have been found to have lower costs of disinflation (Bulíř and Hurník, 2006).

For the purposes of this paper, we find the third argument to be the most important: an inflation-targeting central bank communicates well if the public is able to understand the current monetary stance as well as the most likely direction thereof in the near future. We hasten to add that better transparency does not necessarily or always imply more inflation predictability, owing to the nonmonetary shocks that may hit the economy (Eijffinnger and Geraats, 2006). Moreover, a more transparent central bank may decide to communicate additional uncertainty about its forecast, in turn "clouding the future" for all those trying to guess it from central bank communication.

There are diminishing returns to openness as far as direct and indirect enhancements of economic performance are concerned. It has been argued, at least in the context of the accountability principle, that transparency is a synonym for absolute openness.[3] Transparency requires, however, considering the trade-off between openness, when the central bank does not filter away any information, and clarity, when the central bank does not disclose information that would make it difficult for recipients to understand the core message (Winkler, 2000, Blinder et al., 2001, and IMF, 2006). Thus, disclosure of additional information may compromise the clarity of the analytical or policy message. For example, the public may get confused when minutes from a meeting are published together with an inflation report and the two documents emphasize different economic risks. New information may even introduce inconsistencies into the established communication regime (IMF, 2006).

We argue that policymakers need to ensure all three dimensions of transparency: (i) clarity, (ii) timeliness, and (iii) openness. In our view the clarity of the information to be conveyed to the public determines the success or failure of communication under inflation targeting, as the timeliness and volume of information are not really a constraint in the internet age. We define all three dimensions more carefully below.

[3] See Filáček et al. (2007).

*Clear communication* requires that the various communication tools send signals that are consistent with each other and well coordinated. With the large variety of communication tools available, coordination of the message across the tools is crucial. For example, if the inflation report dwells on upward forecast risks and simultaneously the inflation forecast is below target, the public is likely to be confused as to what future monetary policy is going to be no matter how much additional information supporting both messages is going to be disclosed. In other words, sometimes less can be more.

*Open communication* provides the public with just enough information to understand past economic developments and the future direction of monetary policy. The best practices with respect to inflation reports, minutes of meetings, and forecasting models have been established (Blinder, 2001, and IMF, 2006).

*Timely communication* helps the public to understand the monetary stance in a policy relevant time horizon. Central bank researchers have stressed the usefulness of publishing complete forecasting models regularly, given heterogeneous information among agents, in order to influence expectations of those agents who use simpler models (Akram et al., 2006, and Fukač, 2006). All relevant information needs to be disclosed as soon as possible and certainly prior to the next monetary policy meeting. All the information that is disclosed with longer lags is useful mainly for accountability and research purposes.

But even if the message is clear, should all policymakers speak with one voice? Coordination of communication among Bank Board members can be done in two ways, each of which has its pros and cons (Šmídková, 2005). First, some central banks prefer to form a consensus and communicate with one voice in order to emphasize the main message (the European Central Bank or Bank of Canada). However, the consensual approach does not allow the public to fully understand the internal diversity of the views, which could be used to approximate the uncertainty of monetary decision making. Second, some central banks vote on policy interest rates and disclose the voting pattern to the public in order to draw attention to uncertainty. In such case, however, the central message can be more difficult to extract.

We will assess the recent Czech experience using all three dimensions of transparency outlined above. Our benchmark for open, and to some extent also for timely, communication can be derived from the previously published work. The theoretical literature has recommended what types of information should be disclosed to the public and when. Regarding the former, the inflation forecast was initially the centre of attention (Geraats, 2001). More recently, a whole set of information that should be disclosed in a timely manner has been defined, such as data, forecasts, models, minutes, and evaluations of past policy actions (Eijffinnger and Geraats, 2006). Regarding the latter, "timely" is typically assumed to correspond to "prior to the next meeting." Comparative studies complement the theoretical literature and provide more detailed guidance; see, for example, Heenan et al. (2006). It turns out that successful communication requires carefully targeting selected groups.

As far as clarity of communication is concerned, the existing literature offers fewer clues. We suggest that the true clarity test is an assessment of the understanding of monetary policy by the public in the context of the inflation targeting framework using various communication tools. A successful central bank is understood by the public, whereas an unsuccessful bank is not. To this end, we compute and compare three measures of the risks that alternative communication tools contribute to the central message.

## III. Openness and Timeliness in Communication: The Czech Case

In this section, we assess the openness and timeliness of the CNB's communication strategy using well defined benchmarks. The CNB employs the following communication tools to explain its monetary policy decisions and its views on economic developments: press releases, press conferences, interviews with Board members, minutes of meetings, inflation reports, seminars for financial market analysts, articles by CNB staff in various media, situation reports, internal protocols, and occasional[4] and research publications. Each of these communication tools has its specific content, audience and timing. All communications, with the exception of "historical" materials, are issued simultaneously in Czech and English. Our list is ordered along the timeliness nexus of CNB communication.

### Day 1

The first information about the outcome of a monetary policy meeting (which the CNB issues in a matter of minutes) is a **press release** on the CNB website. This states the current level of policy interest rates and the distribution of the votes within the Board[5]. The targeted audience comprises journalists and analysts. While the former need to prepare for the subsequent press conference, the latter use this information for their work on the financial markets.

The second communication tools employed are **press conferences** of the CNB governor. These are organized for journalists in the afternoon following the monetary policy meeting. The information content is broader than that of the press release, and, on a quarterly basis, when a new inflation report is prepared, the governor presents the inflation forecast. Alternatively, the governor comments on the latest data and their implications for the risks of the forecast in the interim period between two quarterly forecasts. The governor also discusses the unanimity of the voting (or the lack thereof) and comments on the distribution

[4] Occasional policy publications are produced following an update of the CNB's inflation targeting strategy – see http://www.cnb.cz/en/publications/.

[5] Policy meetings currently take place on the last Thursday of each month. Starting January 2008 the CNB will hold only eight such meetings a year (CNB, 2007).

of the votes for alternative policy rate movements. The presentations prepared for the press conferences are available on the CNB website.[6]

**Day 1 to 8**

After the press conference, the individual Board members give **interviews** to the media, explaining the reasons behind the decisions and highlighting specific risks.[7] Since the initial press release does not mention the voting of the individual Board members, these interviews typically do not contain individual assessments of the monetary policy risks. The targeted audience is comparatively broad, and both specialized media readers and the general public can access the interviews on the CNB website after they have been published in the media.

**Day 8**

Eight days after the meeting the CNB publishes the **minutes of the monetary policy meeting**. These contain a brief summary of the staff presentation given to the Board members during the policy meeting.[8] Each quarter, one of these presentations focuses on the new inflation forecast and the two interim presentations focus on new information and implied risks to the forecast. A major part of the minutes is devoted to the Board debate following the staff presentation. The minutes emphasize those parts of the presentation that were commented on by Board members and describe which additional risks were considered. The minutes clearly indicate when Board members disagreed either with the forecast or with the relevance of the forecast risks. The potential audience is again broad, since access to the website is unrestricted and the minutes use nontechnical language.

On a quarterly basis, **inflation reports** are published eight days after the monetary policy meeting together with the minutes.[9] The inflation report is a forward-looking document that describes the new forecast together with the new data used in the forecast, thus containing substantially more data than the other communications mentioned so far. Given its focus on the "central story" behind the forecast, the report contains less information on the risks attached to this forecast than, say, the minutes. Inflation reports are presented to analysts at **special seminars**, which give an opportunity to present the forecasting mechanism in greater

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[6] See http://www.cnb.cz/en/monetary_policy/bank_board_minutes/. Starting in mid-2007, the press conferences have been recorded and .mp3 files are downloadable from the Czech version of the CNB website: http://www.cnb.cz/cz/menova_politika/br_zapisy_z_jednani/.

[7] The board members have agreed not to give interviews in the one week preceding monetary policy meetings. See http://www.cnb.cz/en/media_service/interviews/.

[8] See http://www.cnb.cz/en/monetary_policy/bank_board_minutes/.

[9] See http://www.cnb.cz/en/monetary_policy/inflation_reports/. A hard copy of the report is sent to various target groups, such as journalists, analysts, economists in academia, and members of parliament. The governor presents the CNB inflation report to Parliament twice a year.

detail. In addition, analysts have a chance to ask questions clarifying certain parts of the report or minutes.

**Beyond day 8**

Inflation reports are usually complemented with **articles** by CNB staff in the media. These summarize the key features of the new inflation forecast and interesting partial analyses. They typically do not contain any additional economic information as compared to the inflation report, but they use less technical language in order to disseminate the message to a wider audience. In addition, these articles inform the public about which CNB experts specialize in which particular topics.

**After 6 years**

Six years after the meeting, the CNB discloses two documents that were initially produced for internal purposes. First, **situation reports** are background documents prepared by CNB staff prior to each monetary policy meeting. In comparison to the publicly available inflation reports, the situation reports contain more detailed information and are prepared monthly. Second, **internal protocols** are internal documents prepared by CNB staff after each monetary policy meeting. In comparison to the minutes, the protocol provides a full transcript of the meeting, including the names of the Board members. Unlike the other documents, situation reports and internal protocols are available in Czech only. These documents will be made available on the website as from 2008.

**Irregular frequency**

The CNB regularly communicates changes to its inflation targeting strategy, such as changes to the targeted index or to the policy instruments. These are announced at a press conference and published on the CNB website. Changes in monetary policy strategy are often explained in **accompanying policy documents** of the CNB (see CNB, 2004, or CNB, 2007).

The CNB also produces **research publications** that provide additional information about its inflation targeting strategy. For example, each new forecasting model is made publicly available with a short lag. About one-half of the regularly published in-house research papers deal directly or indirectly with the CNB forecasting mechanism.[10] The potential audience is restricted to CNB watchers and academic researchers, as these publications use technical language.

The above communication tools, their characteristics, and comparisons vis-à-vis international benchmarks are summarized in Table 1. The CNB instantly communicates three major pieces

[10] See http://www.cnb.cz/www.cnb.cz/en/research/research_publications/cnb_wp/index.html.

of information on its website: (i) the outcome of the monetary policy meeting, (ii) either its new quarterly forecast or its assessment of new data in the interim period, and (iii) verbal descriptions of shocks/risks attached to its central forecast. Within one week, additional information is disclosed about the forecast, the new data and the risks, allowing CNB watchers to improve their understanding of monetary policy before the next monetary policy meeting. Detailed information on the forecasting system is occasionally disclosed when the system is significantly modified. For the most patient CNB watchers, the bank eventually discloses full transcripts of the meetings as well as full background documents. However, this detailed and Czech-only information is only of interest to academic researchers for the purposes of long-term monetary policy analysis, and these readers lie outside our definition of transparency of central bank communication.

The following information can be learned from CNB communication: (i) the outcome of the monetary policy meeting, that is, the new level of policy rates; (ii) the inflation forecast; (iii) a verbal description of the risks by staff, which complements the central forecast; and (iv) the distribution of the votes, reflecting the diversity (uncertainty) of views among the policymakers.[11] All CNB communication tools outlining the inflation outcome and forecast are carefully coordinated, including the policymakers' views summarized in the votes, minutes, and interviews.

To sum up, the CNB communicates a lot and in a timely manner. All four types of information identified in the benchmark studies as important for transparency are disclosed in timely manner through various channels. Compared to the communication strategies of other central banks, the CNB ranks well and, indeed, it seems more open than suggested by most of the benchmarks (Eijffinnger and Geraats, 2006, Heenan et al., 2006, Fracasso et al., 2003, and Jarmuzek et al., 2004).

[11] It is worth mentioning that the CNB has worked with an unconditional inflation forecast since 2002; see Kotlán and Navrátil (2003). However, the inflation forecasts deviated significantly from the target in about one-half of cases for the one-year forecast horizon and in one-quarter of cases for the two-year forecast horizon.

## Table 1. Communication Tools: Benchmarks and the Czech National Bank Case

| Communication benchmarks | | CNB communication | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Eijffinnger and Geraats, 2006** | **Heenan et al., 2006** | **Communication tool** | **Time horizon** | **Audience** | **What is being communicated** | | | |
| **Aspects of transparency included in the survey** | **Communication tools recommended** | | | | **Policy decision** | **New forecast or data implications** | **Risks attached to the forecast** | **Forecasting or policy framework** |
| Policy transparency (prompt disclosure of policy decisions) | Press release, prompt reporting on outcome of policy meetings | Press release | Short | Broad | Yes | Not applicable | Not applicable | Not applicable |
| | Press conference | Press conference | Short | Journalists (+website) | Yes | Yes, but limited | Yes, but limited | Not applicable |
| *Not discussed* | Interviews, speeches | Interviews with Board members | Short | Broad | Yes | Yes, but limited | Yes, but limited | |
| Procedural transparency (how the decision was reached, dissemination available within a reasonable time period) | Publication of minutes is highly recommended (published by only 7 inflation targeting central banks) | Minutes of the meeting | Medium | Broad | Yes | Yes, but limited | Yes, in great detail | Not applicable |
| Economic transparency (availability of the forecasting model and data) and operational transparency (evaluation of past performance) | Inflation report | Inflation report | Medium | Broad | Yes | Yes | Yes | Not applicable |
| Economic transparency | Presentations | Seminar for analysts | Medium | Watchers | Yes | Yes | Yes | Yes |
| *Not discussed* | *Not discussed* | Articles by staff | Medium | Broad | Yes | Yes | Yes | Not applicable |
| *Not discussed* | *Not discussed* | Situation report | Long | Broad | Not applicable | Yes, in great detail | Yes | Yes |
| *Not discussed* | *Not discussed* | Internal protocol | Long | Broad | Yes | Yes, but limited | Yes, in great detail | Not applicable |
| Economic transparency | Publication of research on policy issues | Occasional research publications | Long | Broad | Not applicable | Not applicable | Not applicable | Yes, in great detail |
| Political transparency (availability of information on targets and strategy) | Website explains the policy framework | Accompanying policy documents | Prior to change in a strategy | Broad | Not applicable | Not applicable | Not applicable | Yes, modifications in strategy |

## IV. Assessing Clarity in Communication: A Suggested Methodology

This section examines the third dimension of transparency of communication, namely clarity. In this assessment we are left on our own, with no empirical studies to compare our results to. Clarity in our approach means that the various communication tools are well coordinated and that the central message is not polluted by contradictions. Should it contain contradictions, the public would not be able to understand monetary policy actions, and the credibility of monetary policy would be harmed. We hasten to add that contradictions are different from policy or forecast uncertainty—the policymaker should avoid the former, while he should communicate the latter through, for example, the voting pattern or policymaker interviews.

We suggest one possible way of measuring clarity in communication, and in doing so, we face two challenges. First, we must select the most important pieces of information in order to assess clarity. We argue that the three selected indicators—implied risk, comprehensive risk, and the uncertainty indicator—provide a good first-guess approximation of what the educated public would like to understand. Second, we must convert verbal information into numerical data. This conversion is naturally prone to judgment bias and measurement error, but we see no easier way of extracting the relevant information from the inflation reports.

Major obstacles to communication clarity are contradictions among the measures of forecast risks that the public can deduce from the alternative communication tools. For example, the public can use the inflation target, inflation forecast, and observed policy interest rates to compute a forecast risk of inflation and compare it with the verbal description of the risks listed in the inflation report. If these measures contradict each other, the public cannot easily understand the central bank's decisions. The central bank perhaps wanted to be open about disagreements between staff and policymakers or about forecast uncertainty, but such openness may have came at the expense of clarity of communication. Crystal clear communication, in contrast, implies that all measures of the forecast risks point in one direction, ensuring that monetary policy actions as well as economic developments are understood easily. In other words, all communication tools were aligned and the message was clear.

Clarity of communication can be evaluated by comparing the three types of forecast risk extractable from central banks' communication. First, one can compute the *implied risk* from the inflation forecast, inflation target, and policy interest rates. The implied risk approximates the forecast risk—upward or downward with respect to the forecast—identified by the policymakers during the policy meeting. Second, by scrutinizing inflation reports one can construct a *comprehensive risk* indicator. The comprehensive risk indicator reflects which types of risks—again upward or downward—were emphasized verbally by the staff in the inflation report, transforming verbal information into numerical data. Third, information about the voting pattern can be used to compute an *uncertainty indicator*. The voting is typically close if the uncertainty about future developments is high, because policymakers do

not necessarily share the same views.[12] To illustrate the point, let us assume that the central inflation forecast shows inflation close to the target and that four policymakers vote for keeping interest rates unchanged and three for reducing them. The presence of three dissenters suggests downward risks to the inflation forecast.

The public can get confused, however, by comparing the different measures of risks contained in the individual communication tools. For example, the comprehensive risk (verbal assessment-based), reflecting the views of the staff, can differ from the implied risk (target- or forecast-based). Moreover, policymakers view forecast risks differently from the staff, because their information set is different. Also, the distribution of the votes may send a confusing signal that there is a large uncertainty when in reality policymakers held a strong minority view in a split-opinion board, resulting in 4:3 or 3:2 distributions of the votes. We admit that monetary policy communication is unlikely to be crystal clear, or perfectly coordinated, under every combination of shocks, but it can be "clear enough" by clearing up the contradictions between, say, the implied and comprehensive risk through the uncertainty indicator.

**A methodology for risk calculation**

We propose computing the three above measures of forecast risks in the following way. The *implied risk* is the difference between the published inflation forecast and the forecast the public would derive from a simple forward-looking policy rule, based on the inflation target, the inflation forecast, and the current and equilibrium level of interest rates. We use a policy rule analogous to the rule designed by Batini and Haldane (1999) and applied in previous studies dealing with the Czech Republic (Mahadeva and Šmídková, 2001). A positive/negative implied risk, that is, the published forecast lower/higher than the implied forecast, indicates that policymakers attached some upward/downward risks to the central forecast during the horizon of the forecast.

We assume that the public assesses the central bank using a simple forward-looking policy rule $R_{+1} = \gamma R + (1-\gamma)(\delta(\pi^{F}_{+1} - \pi^{T}_{+1}) + R^*)$, where R is the policy rate, $\gamma$ is the smoothing coefficient, $\delta$ measures the aggressiveness of monetary policy towards the inflation target, $\pi^{F}_{+1}$ is the policy-rule-based inflation forecast, $\pi^{T}_{+1}$ is the inflation target for the relevant period, and R* is the equilibrium interest rate. The public has extracted the parameter values, $\gamma$ and $\delta$, from observing past behavior of policymakers. By rearranging the policy rule one obtains an expression for the policy-rule-based inflation forecast, which we also call the implicit forecast, $\pi^{F}_{+1}$. We can then compare it to the officially published forecast, $\pi^{Fp}_{+1}$. A significant differential between these two forecasts would indicate that there were some risks

[12] It could happen, of course, that the individual Board members create a homogeneous group with an identical set of preferences. We see this as a highly hypothetical counterfactual example.

attached to the published forecast over the monetary policy horizon: $\pi^{F}_{+1} - \pi^{Fp}_{+1} = 1/((1-\gamma)\delta)dR - 1/\delta(R^* - R) - (\pi^{Fp}_{+1} - \pi^{T}_{+1}) > 0$. In other words, the central bank increased the policy rate even though the published inflation forecast—for the relevant horizon—was below target.

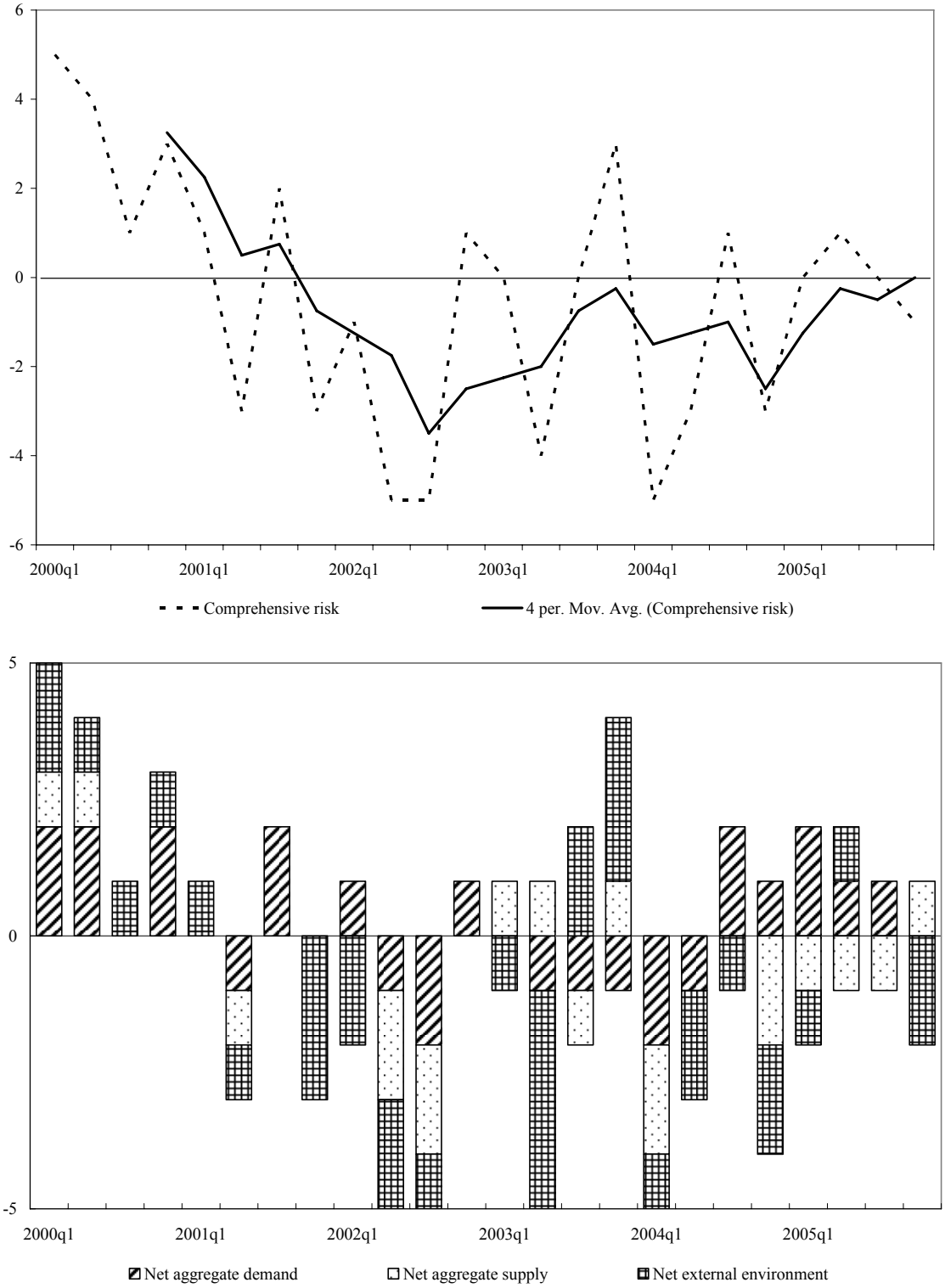
The Batini-Haldane rule, in which the policy rate depends only on the deviation of forecasted inflation from the target, possesses a key attribute of simplicity and as such it seems to be a reasonable approximation of what the public might think about the central bank's reaction function. The public certainly expects higher policy rates if future inflation is seen above the target. The rule's simplicity is also its shortcoming: the public knows that policymakers are rarely "inflation nutters," focusing solely on inflation. Although the public is unlikely to trust the Batini-Haldane rule completely, it would seem equally unreasonable to assume that the public would run a complex forecasting model just check that the central bank bases its decision on one such model, too. The public would rather rely on the inflation-report, verbal assessments to clarify the rule-based understanding of policy decisions.

The *comprehensive risk* aggregates verbal indicators of expected demand, supply and external shocks. We perused the quarterly inflation reports, reporting all verbal assessments and the presumed direction of their impact on inflation. Each shock is given an equal weight, because the inflation reports do not provide information on the shocks' quantitative importance. To this end, shocks expected to push inflation higher are denoted as 1, whereas shocks expected to push inflation lower are denoted as –1. All shocks are then aggregated across categories and we obtain an index-like measure of what the policymakers thought of the implied risks in any given quarter (see Figure 1 for the aggregate measure in the upper panel and a disaggregated measure in the lower panel). This index is then compared with the implied inflation risks obtained earlier. The comprehensive risk is negative/positive if the inflation report mentions only downward/upward inflation shocks or if the sum of all shocks points in one direction. The measure can be inconclusive if it lists both downward and upward inflation shocks and the sum thereof is equal to zero. We were able to identify on average six shocks in each quarterly report or 24 shocks per year. From the figure we deduce that the from early 2001 the comprehensive risk was pointing mostly toward declining inflation, that is, the policymakers observed mostly downward inflation shocks. Moreover, the brunt of these shocks was coming from the external side.

Finally, the *uncertainty indicator* captures the minority voice among the policymakers, giving us a measure of the forecast uncertainty (see the Appendix for quantitative estimates).[13] In the case of a unanimous vote, policymakers express no significant forecast uncertainty. In contrast, if four members vote to keep rates unchanged and three members

[13] It shows the percentage of the votes that were in the minority with respect to the actual decision taken (the percentage of those present). For example, if six votes supported unchanged rates and one vote supported an increase (decrease), the uncertainty indicator takes a value of 14 percent (-14 percent).

**Figure 1. The Czech National Bank: A Measure of Comprehensive Risk**




Source: CNB inflation reports; authors' calculations.
Note: Positive values of the comprehensive risk record frequency of current-period developments pointing toward higher inflation in the period ahead, while negative values of the comprehensive risk record frequency of developments pointing toward lower inflation.

vote to increase them, we interpret this as considerable uncertainty expressed by the policymakers, pointing towards upward risks. While the previous two measures of forecast risks are available only quarterly, the uncertainty indicator can be computed on a monthly basis, given the monthly frequency of monetary policy meetings and the quarterly frequency of inflation forecasts and reports. To keep the quarterly frequency, we compute the quarterly values of the uncertainty risks by summing the monthly values in that quarter.

## V. CLARITY IN COMMUNICATION: THE CZECH CASE

We apply the above methodology to Czech data by computing the three measures of risk on a quarterly basis for the five years (2001–2005) during which the CNB targeted a horizontal inflation target. We take into account two time horizons relevant for monetary policy (one and two years ahead). Our data sources are the CNB inflation reports (CNB, 1999–2005), from which we take forecasts, actual data, and verbal descriptions of shocks and risks to obtain estimates of the comprehensive risk. We use the minutes of monetary policy meetings to compute the uncertainty indicator.

We are aware of potential measurement errors in our computations—we may have either misunderstood or misinterpreted the verbal description of the shock. To this end, we perform two robustness checks. First, the implied risk—the difference between the published inflation forecast and the forecast the public would derive from a simple forward-looking policy rule—is treated as significant only if it is larger than one percentage point, that is, the width of the CNB inflation target. Comprehensive risk is significant if it is different from zero by more than one, that is, by more than the average value of the sum of the shocks. The uncertainty indicator is significant if two or more of the seven-member Board form a minority view.[14] Second, we conduct a robustness analysis in order to see the impact of parameter changes in the policy rule on the values of the implied risk. The quarterly values of these three measures are reported in the Appendix.

We now come to deciding when communication is clear and when it is confusing. With the three risk indicators computed, we can assess whether the indicators have spoken with one voice or one of them "explains" the discrepancy. First, communication is considered to be clear when all three measures point in the same direction—upward, downward, or zero risk. Second, communication is also regarded as clear when two indicators (typically the implied and comprehensive risks) disagree, but the third one (typically the uncertainty indicator) clarifies that the initial discrepancy is due to forecast uncertainty. For example, if the inflation report points to significant upward risks, the actual decision points to significant downward risks and the minority voted for a policy rate increase, we would argue that the

[14] If fewer members were present, we consider the uncertainty indicator significant if the minority is more than 14 percent of the votes.

third measure of risk is explanatory, building a bridge between the first two measures. In contrast, communication is considered to be confusing if the individual measures point in different directions and none of them plays a corrective role.

This concept of clarity corresponds to the way the public works with the three measures of risk. For example, if the inflation forecast is above the inflation target and at the same time interest rates are cut, the public will understand that there is an implied downward inflation risk relative to the forecast that was identified by policymakers during their meeting. The public would be confused, however, if either the inflation report identified strong upward inflation risks or a strong minority voted to keep rates unchanged (or to increase them), thus signaling uncertainty.

The basic summary of our results shows that CNB communication was clear in most cases (Table 2). On average, and taking into account the robustness analyses, all three risk indicators spoke with one voice in about 65–70 percent of all cases, while in the rest of the cases the message was not clear, creating a potentially confusing policy message. We put

**Table 2. Czech National Bank: How Clear Communication was in 2001–2005**

| | | **Communication was:** | |
|---|---|---|---|
| | | **Clear** | **Unclear** |
| Benchmark policy rule | 1Y forecasts | 70 percent | 30 percent |
| | 2Y forecasts | 65 percent | 35 percent |
| Inflation aversion (higher δ) | 1Y forecasts | 65 percent | 35 percent |
| | 2Y forecasts | 60 percent | 40 percent |
| Intense interest rate smoothing (higher γ) | 1Y forecasts | 75 percent | 25 percent |
| | 2Y forecasts | 70 percent | 30 percent |
| Convergence-country equilibrium rates (higher R*) | 1Y forecasts | 75 percent | 25 percent |
| | 2Y forecasts | 75 percent | 25 percent |
| **Alternative parameters of the policy rule** | | | |
| | γ | δ | Real equilibrium interest rate |
| Benchmark rule | **0.3** | **2** | **2** |
| Inflation aversion | 0.3 | **3** | 2 |
| Intense interest rate smoothing | **0.5** | 2 | 2 |
| Convergence-country equilibrium rate | 0.3 | 2 | **3** |

**Note:** The table reports cases in which communication was clear and cases in which the public could get confused (in percent of all 20 observations). Results are reported for two policy horizons. Outcomes of robustness analyses are presented for alternative parameters in the policy rule: $R_{+1}=\gamma R+(1-\gamma)(\delta(\pi^{F}_{+1}-\pi^{T}_{+1})+R^*)$, where R is the policy rate, γ is the smoothing coefficient, δ measures the aggressiveness of monetary policy toward the inflation target, $\pi^{F}_{+1}$ is the policy-rule-based inflation forecast, $\pi^{T}_{+1}$ is the inflation target in the relevant period, and R* is the equilibrium policy rate, equal to the sum of the inflation target and the real equilibrium interest rate.

stress on the qualifier "potentially"—there are good reasons for the three measures of risk to deviate. For example, if supply shocks are large and their impact on prices is uncertain, the three measures of risk are likely to deviate. Dennis and Williams (2007) suggest that under such conditions, high transparency of monetary policy may not be beneficial.

The robustness analyses confirm that our results are not particularly sensitive to changes in the policy-rule parameters. It is also worth noting that communication appears to be somewhat clearer for the one-year horizon as compared to the two-year horizon. This may imply that CNB monetary policy is focused mostly on the following four quarters, consistent with the declared monetary policy transmission horizon of 4–6 quarters, and that the existing communication tools reflect that.

We further disaggregate our results from Table 2 into four and three cases of clear and unclear communication, respectively. First, our exercise suggests that obvious cases of confusion have been rare (Table 3). Strong cases of confusion, that is, when different signals were sent by the implied and comprehensive risks, and in which the voting of a minority of the members of the monetary policy body did not play an explanatory role, were identified in only about one-tenth of all observations for the one-year horizon. Moreover, we expect the public to get somewhat confused when a risk measure is insignificant but the uncertainty indicator does not play an explanatory role, and very confused when the implied and comprehensive risks differ and the uncertainty indicator does not play an explanatory role.

**Table 3. The Czech National Bank: Detailed Results**

| | Clarity of communication (From the strongest to the weakest case) | | | | Extent to which the public could get confused (From the weakest to the strongest case) | | |
|---|---|---|---|---|---|---|---|
| | Crystal clear: All three measures of risk are consistent (or the uncertainty indicator is insignificant) | Clear enough: implied or comprehensive risks are insignificant (and the uncertainty indicator plays a corrective role) | Clear enough: implied or comprehensive risks are consistent (and the uncertainty indicator differs) | Clear enough: implied or comprehensive risks are insignificant (and the uncertainty indicator is consistent or insignificant) | Implied or comprehensive risks are insignificant (but the uncertainty indicator is inconsistent) | Implied and comprehensive risks differ (but the uncertainty indicator plays a corrective role) | Implied and comprehensive risks differ (and the uncertainty indicator does not play a corrective role) |
| One-year horizon | 25 percent | 5 percent | 15 percent | 25 percent | 15 percent | 5 percent | 10 percent |
| Two-year horizon | 20 percent | 5 percent | 35 percent | 5 percent | 10 percent | 10 percent | 15 percent |

**Note:** The table breaks down our communication results into several categories on a scale of clarity and confusion. Each category describes the degree of consistency of the three measures of risk (implied risk, comprehensive risk, uncertainty indicator). For example, we say that communication was crystal clear if all three measures of risk point in the same direction (or two risks point in the same direction and the uncertainty indicator is insignificant). Alternatively, we say that communication could lead to confusion if the implied and comprehensive risks pointed in the opposite direction (one in the upward direction, one in the downward direction) and the uncertainty indicator did not play an explanatory role (pointing in the opposite direction than the implied risk). The results report the relative importance of each category (in percent of all 20 observations) for the two policy horizons. The entries for each forecast horizon add up to 100 percent.

Communication has been crystal clear when all three measures of risk are consistent or the uncertainty indicator is insignificant and the CNB has behaved so in about one-quarter of all cases. In addition, communication has been clear enough in another two-fifths of all cases, the other three cases of clarity involving situations where either one measure of risk is insignificant or the uncertainty indicator plays an explanatory role.

## VI. Final Remarks

Our empirical exercise using the CNB's communication tools shows just how difficult it is to measure the quality of communication, despite the abundant theoretical literature on transparency. The earlier literature has put a lot of emphasis on openness, whereas more recent papers have introduced the concept of two-dimensional transparency, which includes both openness and clarity. The empirical assessments of transparency have focused almost exclusively on the volume of information disclosed and its timeliness. Those studies which have looked at the quality of communication have assessed only one communication tool, not the whole communication strategy and its tools.

We argue that central bank communication needs to be assessed along three dimensions: openness, timeliness, and clarity, with the ultimate goal of making monetary policy easy to understand; and we apply this approach to the Czech National Bank's procedures and data. The first two dimensions—openness and timeliness—are relatively easy to assess using the available benchmarks and we were able to ascertain that the CNB communicates its monetary policy decisions openly and in a timely manner. In any case, these benchmarks are relatively easy to meet: at present central banks can disseminate large volumes of information very fast. We doubt, however, that the volume and speed of communication are sufficient conditions for understanding the economy and monetary stance.

The third dimension—clarity of communication—is significantly more difficult to define and assess, with no suitable benchmarks in the literature. To this end, we introduce a new methodology for assessing clarity of communication by comparing three measures of forecast risk derived from central bank communication. If these three measures—the implied and comprehensive risks, and uncertainty—either speak with one voice or at least complement and explain each other, communication is said to be crystal clear and clear enough, respectively. If these measures contradict each other, communication is said to lack clarity. We find CNB communication to be clear in two-thirds to three-quarters of all cases for the one-year and two-year policy horizons and for alternative policy rules.

## Appendix. Czech National Bank: Three Measures of Forecast Risk

| | One-year horizon | | | | | | Two-year horizon | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Implied risk | | Comprehensive risk | | Uncertainty indicator | | Implied risk | | Comprehensive risk | | Uncertainty indicator | |
| | Computed | Significant | Computed | Significant | Computed | Significant | Computed | Significant | Computed | Significant | Computed | Significant |
| 2001q1 | -1.72 | yes | 5.00 | yes | 0.00 | | -1.81 | yes | -2.00 | yes | 0.43 | yes |
| 2001q2 | -0.45 | | 4.00 | yes | 0.17 | yes | -1.62 | yes | -4.00 | yes | 0.20 | yes |
| 2001q3 | 0.13 | | 1.00 | | 0.00 | | -1.98 | yes | -1.00 | | 0.56 | yes |
| 2001q4 | -0.43 | | 3.00 | yes | 0.00 | | -2.29 | yes | 0.00 | | 0.29 | yes |
| 2002q1 | -0.04 | | 1.00 | | 0.14 | | -1.82 | yes | 5.00 | yes | 0.00 | |
| 2002q2 | -0.39 | | -3.00 | yes | 0.20 | yes | -2.08 | yes | 4.00 | yes | 0.17 | yes |
| 2002q3 | -1.78 | yes | 2.00 | yes | 0.43 | yes | -2.40 | yes | 1.00 | | 0.00 | |
| 2002q4 | -1.55 | yes | -3.00 | yes | -0.57 | yes | -2.46 | yes | 3.00 | yes | 0.00 | |
| 2003q1 | -1.43 | yes | -1.00 | | 0.40 | yes | -2.15 | yes | 1.00 | | 0.14 | |
| 2003q2 | -1.26 | yes | -5.00 | yes | 0.00 | | -2.04 | yes | -3.00 | yes | 0.20 | yes |
| 2003q3 | -1.05 | yes | -5.00 | yes | -0.37 | yes | -2.47 | yes | 2.00 | yes | 0.43 | yes |
| 2003q4 | -0.88 | | 1.00 | | 0.29 | yes | -2.51 | yes | -3.00 | yes | -0.57 | yes |
| 2004q1 | -1.06 | yes | 0.00 | | 0.43 | yes | -1.13 | yes | -1.00 | | 0.40 | yes |
| 2004q2 | -3.75 | yes | -4.00 | yes | 0.14 | | -1.86 | yes | -5.00 | yes | 0.00 | |
| 2004q3 | -1.33 | yes | 0.00 | | 0.00 | | -1.12 | yes | -5.00 | yes | -0.37 | yes |
| 2004q4 | -1.05 | yes | 3.00 | yes | -0.14 | | -0.85 | | 1.00 | | 0.29 | yes |
| 2005q1 | -0.89 | | -5.00 | yes | 0.00 | | 0.17 | | 0.00 | | 0.43 | yes |
| 2005q2 | -2.03 | yes | -3.00 | yes | -0.23 | yes | -0.93 | | -4.00 | yes | 0.14 | |
| 2005q3 | -1.89 | yes | 1.00 | | 0.29 | yes | -1.08 | yes | 0.00 | | 0.00 | |
| 2005q4 | -1.41 | yes | -3.00 | yes | 0.00 | | -1.20 | yes | 3.00 | yes | -0.14 | |

**Note:** Computed values are reported for quarters relevant from the monetary transmission perspective, not for the quarters in which they were published. For example, the comprehensive risk for one-year horizon reported in 2001q1 was constructed from information taken from the inflation report published in January 2000

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